Delhi to report the result of his journey to Lord Hardinge.

We cannot discuss the many interesting results of this remarkable journey. In the Pei-shan Sir Aurel Stein remarks that inscribed slips of wood, thrown out of ancient office-rooms, were often found in refuse-heaps, covered only by a few inches of gravel or *débris,* their preservation in such condition presupposing a remarkable dryness of climate during the last two thousand years. On the other hand, he points out that the final abandonment of the Khara-Khoto settlement was brought about by difficulties of irrigation, and "it was not possible to determine by conclusive evidence whether this failure of irrigation had been the result of desiccation in the Etsin-gol delta, or had been caused by some change in the river-course at canal-head, with which the settlement for some reason was unable to cope. But there seemed to me good reason to believe that the water-supply now reaching the delta during a few summer months would no longer suffice to assure adequate irrigation for the once cultivated area." Obviously the problem of the changes of climate during the historical period will need much further investigation before it can be finally solved, and in the present fragmentary state of our information the question should not be treated in a spirit of confident dogmatism.

It has been arranged that the Indian Government, which liberally contributed to the expenses of the journey, shall receive a considerable portion of the finds, which will be deposited in the new Museum of Indian Art and Ethnography which has been planned at Delhi. We are now so accustomed to the periodical reports of Sir Aurel Stein's explorations that we may fail to appreciate the remarkable courage, tenacity, and executive ability which he has shown in opening up a new region and in reconstructing a hitherto unknown chapter in the history of man.

NOTES.

MR. RUNCIMAN announced in the House of Commons on Tuesday that he had decided to combine the existing Commercial Intelligence Branch of the Board of Trade and the Exhibitions Branch into a new and enlarged Commercial Intelligence Department. The reorganisation of the department is now proceeding.

A ROYAL Commission has been appointed "to inquire into the supply of wheat and flour in the United Kingdom; to purchase, sell, and control the delivery of wheat and flour on behalf of his Majesty's Government; and generally to take such steps as may seem desirable for maintaining the supply." The names of the members of the Commission are:—The Earl of Crawford (chairman), Alan Garratt Anderson (vice-chairman), Sir Henry Rew, K.C.B., Sir George Saltmarsh, H. W. Patrick, Hugh Rathbone, Oswald Robinson, J. F. Beale, and T. B. Royden. Communications intended for the Commission should be addressed to the secretary at Trafalgar House, W.C.

THE Harveian oration of the Royal College of Physicians of London will be delivered on Wednesday, October 18, by Sir Thomas Barlow.

THE Thomas Hawksley lecture of the Institution of Mechanical Engineers will be delivered by Mr. H. E. Jones on Friday, November 3, upon the subject of "The Gas Engineer of the Last Century."

WE learn from the *Times* that Prof. W. von Waldeyer, professor of anatomy in the University of Berlin, has been raised to hereditary nobility on the occasion of his sixtieth birthday.

THE death is announced, at seventy-seven years of age, of Mr. Herbert Jones, known by his work in archæology, particularly with reference to the Roman occupation of Britain, and investigations relating to it at Silchester, Carlisle, Roxeter, and Greenwich.

DR. LE ROY C. COOLEY has died at his home at Poughkeepsie, N.Y., at the age of eighty-three. He was professor of physical science at the N.Y. State Normal College from 1860 to 1874. In the latter year he became professor of physics and chemistry at Vassar College. He held that post until 1894, when he was appointed to the chair of physics in the same institution. He retired in 1907. He was the author of several text-books of physics and chemistry. In 1899 he was elected president of the N.Y. State Science Teachers' Association.

THE death is announced, in his fifty-seventh year, of Dr. C. S. Prosser, head of the department of geology in the Ohio State University, with which he had been connected since 1899. He had previously occupied the chair of natural history at Washburn College, Topeka, Kansas, and of geology at Union College, N.Y. He was an assistant-geologist of the U.S. Geological Survey, and of the State Geological Surveys of Kansas, New York, Ohio, and Maryland. In addition to many official reports, he had published works on the stratigraphic geology and palæontology of Pennsylvania, New York, Kansas, Nebraska, Maryland, and Ohio, the Devonian of New York, Pennsylvania, and Maryland, and the Permian of Nebraska, Kansas, and Oklahoma.

WE regret to note in *Engineering* for October 6 the death, on October 1, in his seventy-sixth year, of Sir W. Theodore Doxford, at his residence, Grindon Hall, Sunderland. As a shipbuilder Sir Theodore greatly assisted in the development and improvement of cargo-carrying steamers. In 1895 the output of the works on the Wear with which his name is associated exceeded that of any other shipbuilding establishment in the country. Sir Theodore became a member of the council of the Institution of Naval Architects in 1896, and was president of the North-East Coast Institution of Engineers and Shipbuilders in 1886–87. He took an active part in the public life of the district in which his works were located, and was a Deputy-Lieutenant of the county of Durham.

MR. J. ACKWORTH PLOMMER has presented to the Geological Department of the British Museum an unusually fine portion of a Hippurite from the Chalk of Boughton-under-Blean, near Faversham, Kent. The specimen is part of the conical valve of the shell, which must have measured from 2 to 3 ft. in length, with a maximum diameter of about 8 in. The shell-substance is more than 2 in. in thickness, and of the usual open texture. The fossil seems to belong to a species, *Radiolites mortoni,* which is already known by fragments from the English Chalk, and by finer specimens from the Cambridge Greensand. The rarity of Hippurites in the Chalk is curious considering their immense abundance in the limestones of corresponding age in central and southern Europe, and in certain regions of Asia, where they form the main part of some mountains.

WHEN the Gilbert Club was inaugurated in 1889, it had nearly one hundred members. The president was Lord Kelvin, and the secretaries were Mr. Conrad W. Cooke, Prof. R. Meldola, and Prof. S. P. Thompson, all of whom, except Mr. Cooke, have since died. The first object of the club was to produce and issue an English translation of Gilbert's "De Magnete" in the manner of the folio of 1600. This was done, but no general meeting has been held since the club was inaugurated, and as the principal founder, Prof. Thompson, has passed away, it is proposed to wind up the affairs of the club. A general meeting will be held, therefore, in the rooms of the Royal Society of Arts on Wednesday, October 18, at 3.30 o'clock p.m., the Right Hon. Lord Moulton in the chair, for this purpose. Proposals will be made as to the disposal of the property of the club, consisting of the remaining copies of the book, as well as of such funds as are in the hands of the hon. treasurer, and matters will be brought forward of considerable interest to all who wish to perpetuate the memory of William Gilbert of Colchester.

THE death of Dr. Joseph Anderson, of Edinburgh, at the ripe age of eighty-four, removes a notable personality from the ranks of scientific workers. Born in 1832, he originally intended to devote himself to a scholastic career. After several years of teaching, three of which (1856–59) were spent in Constantinople, he turned to journalism instead, becoming editor of an important provincial newspaper in the extreme north of Scotland. It was during his nine years of residence at Wick that he found his true vocation. Caithness is singularly rich in prehistoric monuments, and Anderson's acute intelligence was at once attracted by the difficult problems which these present. He realised from the outset that the only hope of a solution lay in the rigid application of the methods of science. He therefore set himself to ascertain the precise facts, resolutely refusing to theorise unless and until a sufficient basis for induction had been securely established. His earliest results were so full of promise and were set forth in so lucid and incisive a style that, on a vacancy occurring in 1869, he received a unanimous invitation to accept the keepership of the National Museum of Antiquities in Edinburgh, and with it the assistant-secretaryship of the Society of Antiquaries of Scotland. These posts he held until 1913, when he retired with a Civil List pension. It is not too much to say that in the interval he revolutionised the whole study of Scottish archæology, his chief publications being his five series of Rhind lectures, which stamp him indubitably as a master of the science of research and of the art of clear exposition.

SIR ROBERT HUDSON, chairman of the Joint Finance Committee of the British Red Cross Society and the Order of St. John (83 Pall Mall), publishes in the *Times* of October 10 the following letter received by him from "A Past President of the Chemical Society" and "A Past President of the Society of Chemical Industry":—"An industrial body in the United States of America recently requested our scientific advice. We felt bound to reply that all extraneous work not desired by the State could only be undertaken on behalf of the British Red Cross Society, to which any honorarium must be directly transmitted. The corporation having responded most handsomely to our terms, we gladly hand over cheques each for 1000 guineas, forwarded under the condition above specified. The bounds of the scientific profession are very extensive, and many individuals are receiving large pecuniary benefits accruing, directly or indirectly, out of applied science. We earnestly hope that many colleagues will come forward and help on the beneficent work of the British Red Cross Society." Sir Robert Hudson expresses the hope that the fine example thus set by his two correspondents will commend itself to others; and we are sure that no objects make a stronger appeal to the scientific world than those with which he is associated. Very few men of science, however, are receiving such handsome fees as those which have just been forwarded to him, and most of them are engaged in national work of one kind or another without receiving any payment for their services. The appeal should be, therefore, not so much to scientific workers as to manufacturers and others who are benefiting by expert knowledge, often given gratuitously.

IN the June issue of the Journal of the Royal Society of Antiquaries of Ireland the address delivered by the president, Mr. T. J. Westropp, on "The Progress of Irish Archæology" is published. The society was founded in Kilkenny in 1849, and since then has held a high record for a long series of valuable papers published in its Proceedings. It was said when the society migrated from Kilkenny to Dublin that archæology in Ireland sprang from the novels of Sir Walter Scott or from Macpherson's "Ossian." There is some truth in this statement. The president's account of the early Irish antiquaries, among whom portraits of W. Mollineaux, C. O'Connor, C. Vallancey, and G. Petrie accompany his address, is lively and interesting. He speaks hopefully of the study of Irish antiquities, which, among its ablest students, exhibits a dislike for sweeping theories. But he remarks:—"In our country a bad theory—no matter how often refuted—never dies. Scientific antiquaries have too much to do to refute for the tenth or twelfth time these absurdities. We shall never be in a satisfactory position till in archæology, as in natural science, the man who attempts to revive an exploded error only slays his reputation and deceives no one but himself."

THE problem of the origin of what he called the Indo-Aryan type of Indian temples was never completely solved by James Fergusson, and later inquirers have done little to produce a solution. In the June issue of the Journal of the Bihar and Orissa Research Society Dr. D. B. Spooner, well known for his excavations at the site of Pataliputra, has in a great measure solved the difficulty. Beginning with the most primitive form of shrine, little more than a square box, he shows that the desire of the Indian architect was to produce a play of light and shade by advancing the central portion a little way, and then to repeat the process, so as to produce a lower structure decorated with three miniatures. At some stage of the local architectural history this threefold division seems to have come prominently into notice, and the architect conceived the idea of balancing this triplicity rhythmically by a corresponding threefold division of his tower in horizontal stories. This idea of the architectural rhythm is very ingeniously developed by Dr. Spooner, and his paper deserves the attention of architects. He closes by saying:—"The people of Tirhut are to be warmly congratulated on the possession of so complete a series of temples as they now possess, a series sufficient to illustrate the whole development of this important style, and a series including many shrines of special interest and beauty. Let us hope that they will do their best to safeguard their inheritance, and to maintain the temples we have seen in good condition."

The "Terrapin" scale (*Eulecanium nigrofasciatum*) is the subject of Bulletin No. 351 of the U.S. Dept. of Agriculture, written by Mr. F. L. Simanton. This is a North American insect, closely allied to our European *E. persicae,* destructive to peach and plum, and feeding also on thirty other trees and shrubs. The females hibernate on the twigs, where, instead of laying eggs, they give birth to active young, which migrate to the leaves. Much damage is caused by the insects' honeydew secretion, which disfigures the fruit. The bulletin is well illustrated, and contains directions for remedial treatment, early spraying with a linseed oil and gasolene emulsion being especially recommended.

Notes of much interest appear in the *Zoologist* for September on the mammalian fauna of North Cardiganshire. The author, Mr. Frank Wright, records the occurrence, during the last ten or twelve years, of a number of polecats of a very light colour, some individuals, furthermore, exceeding in size the more normally coloured animal. Both light- and dark-coloured individuals have been taken from the same pest. The pine-marten, he remarks, is now exceedingly rare, but a few apparently survive on the high plateau east of Tregaron. The foxes of the uplands also seem to differ from the type in the matter of coloration, being much greyer. But a specimen taken near the summit of Plinlimmon was quite black instead of white on the under parts.

Mr. Zonia Baber, in the *Scientific Monthly* for September, raises a timely protest against the wholesale slaughter of whales which is at present taking place throughout the seas of the world, and this without the slightest attempt at preventive legislation. The author, in his essay, "The Oceans: Our Future Pastures," holds that the time will come when men will have to depend upon the larger Cetacea for their meat supply, since the grazing of cattle will be impossible owing to the density of the population, which will cover the whole habitable globe. While we by no means agree with this view, we are at one with him that, for other and scarcely less cogent reasons, the present ruthless and wasteful exploitation of our whale fisheries constitutes a deplorable lack of foresight on the part of those engaged therein. The matter demanded international legislation long ago, and even now it is not too late, though, unless it come speedily, the Greenland and humped-back whales and the grey whale (*Rhachi anectes*) will have taken their places with Steller's sea-cow and the great auk—victims to man's greed.

It is clear from the annual report of the British Museum (1915) that the Natural History Departments have been able to render useful aid to the military authorities in matters directly bearing on the war. In one case a leech, removed from the nose of a soldier invalided home from the Dardanelles, was sent to the museum from the military hospital in order that it might be identified and its habits described. A report on the matter was prepared by the keeper of the Zoological Department embodying useful advice and instructions, and this report was sent to the medical officers serving in the Mediterranean in order that the necessary precautions to avoid further infection might be taken. The Botanical Department was enabled to furnish the authorities of the Naval Air Service with valuable information in regard to wood suitable for airship construction. Further assistance was also given in regard to a fungus which was attacking the fabric of airships. Valuable work has also been done in regard to the supposed hibernation of the house-fly, and to the whaling industry in the Antarctic seas, which is carried on in the neighbourhood of South Georgia so thoroughly that some species are threatened with extinction.

The best-known instances of luminosity in insects are to be found among the beetles; the various species of glow-worm and firefly belong to this order. But the same, or an analogous, phenomenon is occasionally observable in other insect groups, as, for example, in the "fungus gnats" and crickets. There are at least two well-authenticated records of luminosity in the larvæ of moths, and quite recently the Rev. J. Holroyde, vicar of Patcham, has reported to us an observation of luminous larvæ near Brighton. The species of these larvæ was not determined, but they appear to have been the caterpillars of a moth, probably a Noctuid. Boisduval, whose record is one of those above alluded to, believed that the luminescence in his larvæ was due to disease, and it has been suggested that decomposition due to bacterial infection is the cause of a similar appearance that has been described in other insects not usually luminous, as Chironomus (a kind of gnat) and the so-called "lantern-flies" of South America. It is evident that the exceptional production of light in the cases just mentioned is very different in nature from the entirely normal illumination of the glow-worms and fireflies, though it may equally be due to the oxidation of some organic material.

The excellent work in agricultural science which is being carried on at Moscow under the guidance of Prof. D. N. Prianichnikow is amply illustrated in the recently issued report (vol. x.) of the Agronomical Laboratory for the year 1914. As in past years, much attention has been devoted to the investigation of the merits as fertilisers of various natural phosphates and potash-bearing minerals, fully one-half of the papers included in the report having reference to these products. The assimilation and utilisation of ammonia by the plant have also received considerable attention. The experiments with phosphates have demonstrated the relatively high value of certain of the Russian phosphorite deposits, increases of crop as high as 60 to 70 per cent. of the highest obtained with superphosphate having been recorded in tests with cereal crops. This is in marked contrast to the results of earlier experiments recorded in previous reports, which indicated that, in general, phosphorites are almost valueless for cereal crops, though of appreciable value for leguminous crops.

Useful data as to the limits of tolerance of crop plants for sodium salts present in the soil are given by Messrs. Headley, Curtis, and Scofield in the latest issue of the *Journal of Agricultural Research* (vol. vi., p. 857). Experiments in Nevada have shown that the limit of tolerance is extremely variable, being influenced not only by such factors as kind of soil, salt, or crop, but the same crop plant shows marked differences in tolerance at different periods of its growth. So far as the amount of salt is concerned the limit of tolerance is dependent not so much upon the total quantity of the salt that may be present in the soil as upon the quantity that exists in the soil solution, and is recoverable from the soil by means of extraction with water. In pot experiments with soil from a tract of salt land in Nevada it was found that the proportion of recoverable salt which would reduce by one-half the growth of wheat seedlings was for sodium carbonate or bicarbonate 0·04 per cent. of the dry weight of the soil, for sodium chloride 0·16 per cent., and for sodium sulphate 0·35 per cent. The proportion of recoverable salt which prevented germination of wheat was for the carbonates 0·13 per cent., for the chloride 0·52 per cent., and for the sulphate 0·56 per cent.

The investigation of the equations of motion of an aeroplane under the action of atmospheric disturbances such as gusts of wind is a problem to which attention was directed by Prof. Bryan in 1911 ("Stability in Aviation," pp. 178–79, problems 4, 13). An attempt to solve this problem has now been made by Prof. Edwin Bidwell Wilson (S. Doc., 268, Sixty-fourth Cong., 1st sess.). The method adopted in this case consists in treating the disturbed motion as a forced oscillation, the disturbance being expressed in the form of an exponential function of the time. Unfortunately, however, it is not possible to obtain a simple solution of the problem in a symbolic form, and what Prof. Wilson has been able to do is to obtain numerical results for a particular aeroplane of which the values of the stability-coefficients have been determined experimentally. It will thus be necessary to repeat the calculations every time a new aeroplane is built. Prof. Wilson has for no adequate reason departed from the standard notation in his choice of axes. The problem with which he is dealing is only the two-dimensional case of longitudinal disturbances, and it is the universal custom in treatises both on pure and applied mathematics to choose x and y as co-ordinates in all two-dimensional problems. The same practice was followed in the earliest stability investigations both in England and abroad, and the difference of notation is bound to cause confusion.

In a paper which appears in the August number of the Science Reports of the University of Seddai Messrs. Honda and Okubo arrive at an expression for the force on one of the elementary magnets of a group arranged in a space-lattice due to the presence of the other magnets of the group. From this, on calculating the effect of an external field, they are able to obtain the magnetisation curve, and find it is identical with the well-known experimental curve. On varying the external field in the usual cyclic manner, the hysteresis loop is reproduced. It is then shown that the whole of the magnetic properties of magnetite can be reproduced on the theory that the elementary magnets constitute a cubic space-lattice, while those of pyrrhotine require a hexagonal lattice, as would be expected from its crystalline form. This molecular configuration for magnetite does not agree with that deduced by Bragg from the behaviour of the crystal towards X-rays. Finally, the authors show that the properties of ferromagnetic materials can be more completely and satisfactorily explained on the basis of the mutual action of elementary magnets than by the molecular field theory of Weiss.

A recent publication of the U.S. Coast and Geodetic Survey (Serial No. 23, Washington, 1916) gives the results obtained during 1913 and 1914 at the observatory near Tucson, Arizona. This observatory, which commenced operations in 1910, has a set of Eschenhagen magnetographs. The annual variation of temperature in the magnetograph chamber is about 13° C., but the diurnal range is only about 0·1°. Notwithstanding the favourable temperature conditions, the horizontal and vertical force magnetographs have given considerable trouble, large variations taking place in the scale values. The declination magnetograph has worked more satisfactorily, and as three absolute declination observations are taken weekly, the results for that element should be especially trustworthy. The Coast and Geodetic Survey has decided to refer all observations of horizontal force to the so-called "international standard" of the Carnegie Institution of Washington. This entails the application of a correction of $-23\gamma (1\gamma \equiv 1 \times 10^{-5}$ C.G.S. unit) to previously published values of horizontal force at Tucson, and of a corresponding correction to vertical force. Thus the mean annual values for earlier years printed in the present volume differ from those previously published. Opinions may differ as to whether this departure is not a little premature. Diurnal inequalities are given for the ten quietest days of each month and also for the five international quiet days. Mean monthly values are given for both these sets of days, as well as for all days. The all-day mean in horizontal force, on the average of the twenty-four months of the two years, is about $2{\cdot}6\gamma$ below the other two means. Seven folding plates reproduce the magnetograms showing the chief disturbances of the two years. The largest disturbance in both years occurred in April, but no disturbances were of outstanding magnitude. The observatory also possesses a Bosch-Omori seismograph recording N.-S. and E.-W. components of seismic motion. The earthquakes recorded are enumerated, and particulars are given of their principal features, but there is no information as to their epicentres. Much the largest disturbance recorded was that of March 30, 1914.

Many engineers contend that the pressure over the teeth in modern high-speed gearing must be far from uniformly distributed. An interesting and new method for preventing any excessive concentration of the load on any part of the teeth is described in *Engineering* for October 6. The gearing was constructed by the General Electric Company of Schenectady, and used for coupling a high-speed steam turbine to a low-speed continuous-current generator. The wheels have double helical teeth, and the large wheel is built up of several comparatively thin discs, each separated from its neighbour by a small interval. The discs are bolted solidly together at their inner peripheries, but stand free from each other at their outer circumferences. Each disc has thus considerable axial flexibility, and if the load tends to be concentrated on any one of the discs, that disc bends axially, since the teeth are of the helical type. In this way the disc is relieved of the excess pressure, and a fairly uniform distribution of the load is secured. To enable the teeth to be cut on the rims of the discs, the discs are so made in the first instance as to be in contact also at the outer peripheries. The teeth can thus be milled without the discs springing, and after this operation is finished a narrow cut is made between the discs so as to obtain the required axial flexibility.

A shilling edition of Sir Ray Lankester's well-known and deservedly popular "Science from an Easy Chair" has been published by Messrs. Methuen and Co., Ltd. This is the ninth edition of the book, which was first published in April, 1910, and reviewed in our issue of July 14 of that year (vol. lxxxiv., p. 37)

A French translation of Prof. F. Soddy's monograph on the chemistry of the radio-elements, published in 1912, has been made by M. E. Philippi, and is issued by MM. Gauthier-Villars and Co., in Paris, under the title "La Chimie des Eléments Radioactifs." The price of the volume is 5 francs.

The Wireless Press, Ltd., will shortly publish "The Measurement of Capacity and Inductance," by W. H. Nottage, illustrated, and a new and enlarged edition of "Elementary Principles of Wireless Telegraphy," by R. D. Bangay.

The recently issued announcement list of the J. B. Lippincott Company includes the following new books and new editions:—"Shakespeare and Precious Stones," Dr. G. F. Kunz, illustrated: the work will treat of all the known references to precious stones in Shakespeare's works, with comments as to the origin of his material, the knowledge of the poet concerning precious stones, and references as to where the precious stones of his time came from; "Rings," Dr. G. F. Kunz, illustrated; "The Art of Anæsthesia," Dr. P. J. Flagg, illustrated; and (in "Lippincott's Farm Manuals") "Productive Sheep Husbandry," Prof. W. C. Coffey, illustrated; "Productive Marketing of Farm Products," A. E. Cance, illustrated; "Productive Feeding of Farm Animals," Prof. F. W. Woll, new edition, illustrated; "Productive Soil Maintenance," C. E. Thorne, illustrated; "Animal Husbandry," Prof. C. W. Gay, illustrated; "Productive Grape Growing," Prof. B. S. Pickett, illustrated.

OUR ASTRONOMICAL COLUMN.

Fireball of October 3.—Probably what was the most brilliant meteor that has appeared in the present year was seen on Tuesday, October 3, at 8.5 p.m. It passed over Devonshire, and, though the night was cloudy, it gave a very vivid illumination of the sky and landscape, and its apparition was witnessed by great numbers of persons in the S.W. counties of England.

The observations are, however, not very accurate or consistent one with another in consequence of there being very few, if any, stars visible at the time from which its path might be taken. The flight was vertical as observed at Bristol, and was similarly described at various stations in Devon and Cornwall, so that a radiant at or near the zenith is inferred. At Launceston, however, the course is stated to have been from E. to W., and the fireball burst when near the zenith. Mr. W. F. Denning has determined the real path from the data at hand, and places the probable radiant in the head of Cepheus. The height of the meteor was about 67 to 30 miles above a point of the earth's surface some 15 miles E.N.E. of Exeter. A few further observations from Dorset or Devon would be very valuable as affording a test of the accuracy of this result; any such observations should be sent to Mr. Denning, 44 Egerton Road, Bristol.

Mercury Visible Before Sunrise.—Mercury will be a morning star during the latter half of this month, and at its greatest western elongation at midnight following October 20. The planet will rise from a point a little S. of due E. at the following times:—

	Mercury rises a.m.	Sun rises a.m.	Mercury precedes Sun h. m.
Oct. 15	4 51	6 26	1 35
17	4 48	6 29	1 41
19	4 46	6 32	1 46
21	4 46	6 36	1 50
23	4 50	6 39	1 49
25	4 58	6 42	1 44
27	5 8	6 46	1 38
29	5 17	6 49	1 32
31	5 27	6 53	1 26

The waning crescent of the moon will be in the same region of Mercury on the morning of October 25.

The Distribution of B Stars.—An important memoir on the distances and distribution of the B (helium) stars has been published by Prof. Charlier (Nova Acta Reg. Soc. Sci., Upsala, series iv., vol. iv., No. 7). It contains all the details which led to the general conclusions previously announced (Nature, vol. xcvii., p. 369). In a group of stars having the same luminosity, the distance (r) of each individual star can be deduced from the apparent magnitude (m) by the relation $r = R . 10^{0 \cdot 2\, m}$, where the parameter R is the distance for apparent magnitude 0·0. A first determination of R was based upon the proper motions and radial velocities of 156 stars brighter than 5th magnitude, for which the requisite data were available; its value is 4·76 siriometers (1 siriometer = a million times earth's distance from sun). The corresponding absolute magnitude, or apparent magnitude at a distance of one siriometer, is given by $M = -5 \log R$, and is equal to $-3 \cdot 39$. It was next discovered that the fainter stars gave a somewhat smaller value of R, and the brighter stars a higher value. This anomaly was found to be due to the varying luminosities of the different sub-classes. Separate investigation of these showed, in the main, that types B1 and B2 have the greatest luminosity, R being 7·4 sir., whereas types B0, B3, B5 have a value of $R = 3 \cdot 3$ sir. For each subclass the value of R appears to be independent of apparent magnitude. Having the value of R for each sub-class, the position in space of each star at once follows, and it results that the B stars form a well-defined cluster, gradually thinning out from the centre to a distance of 200 siriometers. The centre of the cluster, which Prof. Charlier supposes to be coincident with the centre of the stellar universe, is in R.A. 7·7h., declination $-55 \cdot 6°$; it lies in a rich region in Carina, at a distance of 18·2 sir. from the sun. The cluster has an extension nearly three times as great in the plane of the Milky Way as in the direction at right angles, and the sun lies eccentrically with respect to it, at a distance of 4 sir. above the fundamental plane of the Milky Way. The mean density amounts to 0·0026 stars per cubic siriometer. A catalogue of the 804 known B stars is given, showing all the data relating to type, magnitude, distance, galactic co-ordinates, and so on. The distribution of the stars is further shown diagrammatically, and stereoscopic charts are in course of preparation. It is of interest to note further that the nearest B star is α Eridani, with a distance of only 4 sir. ($\pi = 0 \cdot 0516''$), while the three stars in the belt of Orion come next, with a distance of 8 sir. So far as they go, direct determinations of parallaxes support the values of R used in the investigation.

The Spectroscopic Binary χ Aurigæ.—An orbit for the spectroscopic binary χ Aurigæ (type B1) has been calculated by R. K. Young from eighty-eight single-prism spectrograms taken at Ottawa in the years 1913–16 (Journ. R.A.S. Canada, vol. x., p. 358). The period has the exceptional value, for an early type star, of $655 \cdot 16 \pm 5 \cdot 26$ days; the eccentricity is 0·171, and the orbital velocity 20·53 km./sec. The residuals from the simple elliptic orbit were examined for indications of the presence of a third body, but no secondary period was found; further investigation of this point, with high dispersion, is considered desirable. The calcium lines (H and K) have an amplitude of about half that shown by other lines of the spectrum. A useful summary is given of the different cases of anomalous behaviour of the calcium lines at present known, and Mr. Young considers that the phenomena are best explained on the supposition that there is a calcium cloud surrounding the binary, the absorption of this substance taking place at a much higher level than that of the other elements.

A New Astronomical Journal.—We have pleasure in directing attention to the publication in France of a new monthly periodical devoted to astronomy and meteorology. It bears the title *La Revue Verte*, and is edited by the Abbé Th. Moreux. The journal is intended especially for amateurs, and will include articles giving practical instruction in methods of observation, in addition to general astronomical news, and notes on celestial phenomena during each month. In the first number there is an article on sun-spots and meteorology by the editor, and the first of a series of articles on variable stars by Prof. Moye. There is also a brief biography, with portrait, of M. Baillaud, director of the Paris Observatory. All communications are to be addressed to M. l'Abbé Th. Moreux, Observatoire de Bourges (Cher), France. The annual subscription is 6 francs in France, and 7 francs for other countries.